



Addressing Human Error in International Space Station Flight Control Teams: Advances in Ground Training for Science Operators

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Who We Are

Payload Operations Integration Center

- Responsible for the operation of NASA payloads onboard the ISS
- Integrate with international and commercial partners
- Staffed 24 x 7 by a cross disciplinary team of flight controllers



Our Project Goal

- Develop a formal training program to address flight control errors caused by poor teamwork
- Tailored for POIC culture and addressing common challenges in cross functional teaming
 - Trust Building
 - Communication
 - Conflict Management
 - Leadership
- Inspired by existing NASA developed training programs including Crew Resource Management (CRM) and Space Flight Resource Management (SFRM)

Challenges

- **Avoiding past training mistakes**
 - More than a “Band Aid” solution
 - Outside the box training techniques
 - “They don’t understand what we do”
- **Addressing a diverse audience**
 - Trainee and veteran operators
 - Many different work functions
- **Organizational resistance**
 - Veteran operators resistant to additional non - technical training
- **Limited manpower**
 - Developing content
 - Recruiting and training skilled instructors

Team Skills Training

Classroom lessons-

- Team dynamics
- Situational awareness
- Critical thinking
- Communication
- Leadership
- Conflict management
- Flight control criticality

1. Team Skills Curriculum

- Target audience: trainees
- 4 half day blocks of courses

2. Team Skills Refresher Workshop

- Target Audience: certified operators
- 2 day workshop

An Example Class - Leadership

- Team activity -
 - What leaders inspire you?
 - What characteristics do they have?
- Consider a series of leaders, what leadership characteristics do they have?



An Example Class - Leadership

- Solo and partner activity -
 - What leadership characteristics do you see in yourself?
 - How can you use those strengths to lead from your role in payload operations?
- Influence leadership techniques
 - Quotes from veteran payload operators
 - Group discussions

An Example Class - Leadership

- Team Activity -
 - Build a Lego rocket with constraints
 - Debrief exercise



- Reflect and fill out action plans

Shifting a Culture

Complementary Classes-

- **People Smart**
 - 2 day workshop
 - Taught externally
 - Focused on conflict management and how to work effectively with different behavioral styles
- **Human Innovation**
 - 1 hour workshop
 - Included in basic flight controller training
 - Focused on the importance of creating a psychologically safe environment that supports innovation

Implementation Success Factors

- Management support
- Leveraging existing training programs
- Relevancy and tailoring of content
- Innovative training techniques

“My favorite part about the workshop was the Lego team building exercises. They were fun, practical, and allowed people to lower their guard and made everyone feel on the same level while demonstrating the importance of teamwork .”

- Train the trainer
- Continuous Improvement

Forward Work

- **Tailor content more**
 - Additional examples and exercises
- **Low fidelity simulations**
 - Moon base simulations
 - Provide opportunity to practice skills
- **Increase reinforcement**
 - Emphasize concepts beyond the classroom in on the job training and simulations
- **Improve effectiveness measures****
 - What is the true impact of team skills training?